



City of Phoenix
WATER SERVICES DEPARTMENT

CERTIFIED MAIL – Return Receipt Requested

April 25, 2000

Mr. Jeff W. Stuck, Manager
Drinking Water Section
Arizona Department of Environmental Quality
3033 North Central Avenue
Phoenix, Arizona 85012

Mr. Marvin Young
Mail Code WTR-6
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

RE: MTBE and Perchlorate Supplemental Environmental Project 2 (SEP 2)
Second and Final Status Report

Greetings Gentlemen:

Enclosed are the analytical results of the MTBE and Perchlorate samples collected during the First Quarter of 2000. This was the last of the two sampling rounds specified in our MTBE and Perchlorate SEP 2, dated 07/08/1999 (copy enclosed). The first quarter is the coldest period of the year and recreation activities such as boating and jet skiing are very limited at the surface water source locations. Also enclosed, is a copy of the Third Quarter of 1999 analytical results table, for your reference. This concludes the City of Phoenix's SEP 2.

Please note that all the locations specified in the 07/08/1999 SEP 2 have been sampled, except for the following changes:

- ✓ Finished water samples from only 31 City of Phoenix Points of Entry (POEs) were collected and analyzed instead of 33, since two (2) groundwater POEs which were scheduled to be sampled were out of service for the entire First Quarter 2000 due to construction projects. These are POEs 234 and 249. From the sampled POEs, Perchlorate was detected only at the Union Hills Water Treatment Plant (WTP) - Mod 1 and Mod 2 (POEs 405 and 406) with a concentration of 5.3 µg/L and 5.2 µg/L, respectively. MTBE was not detected at any of the city's POEs.
- ✓ Two additional surface water locations have been sampled that were not originally listed on the 07/08/1999 SEP 2. These locations are upstream and downstream of Lake Pleasant. The upstream location was sampled to see if there are any changes between Lake Havasu and Lake Pleasant. Perchlorate was detected at both Havasu Pump Station and Lake Pleasant –

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Upstream with a concentration of 6.0 µg/L and 6.6 µg/L, respectively. Lake Pleasant - Downstream location was sampled in order to compare its analytical result with the sample collected from the CAP Canal - McKellips Bridge (leaving the Phoenix Metropolitan area). Perchlorate was detected at both Lake Pleasant - Downstream and CAP Canal - McKellips Bridge with a concentration of 5.4 µg/L and 5.7 µg/L, respectively. MTBE was not detected at any of these four locations.

Perchlorate was also detected in the city's Deer Valley and Union Hills WTP's raw water and at Lake Pleasant (at the dam discharge) at concentrations of 4.1 µg/L, 5.1 µg/L and 4.0 µg/L, respectively. MTBE was only detected at Lake Havasu City Well #15 at a concentration of 0.5 µg/L.

In addition to the MTBE and Perchlorate analysis results, the following information is being provided for each sampling location: GPS coordinates, zip code, sample date, sample time, sample depth representative of where the sample was drawn from (surface water locations, only), air temperature, water temperature, pH and conductivity. This additional information is provided based on ADEQ's request that information collected for this study can be used with the Arizona Perchlorate and MTBE Occurrence in Drinking Water Study.

We have received a copy of the DEQ Document Number: OFR 99-14, titled Arizona Perchlorate Occurrence Study Drinking Water Sources - Phase One, recently published by ADEQ, and was pleased that our MTBE and Perchlorate sample results for the Third Quarter of 1999 were used. A copy of this document is enclosed.

Please note that Squaw Peak WTP (finished and raw water) was originally sampled for both MTBE and Perchlorate on 02/29/2000, however, resamples for Perchlorate were required since the original samples were received by the contract lab at an unacceptable temperature. Squaw Peak WTP (finished and raw water) was re-sampled on 03/07/2000. Please refer to the attached table for the analytical results.

Final expenditures for the MTBE and Perchlorate SEP 2 are \$44,878.05. These expenditures are listed in the following table.

Expenditures for the MTBE and Perchlorate SEP 2			
	Third Quarter 1999	First Quarter 2000	Total Expenditures
Laboratory Services	\$3,389.72	\$19,344.00	\$22,733.72
Pollution Control Division	\$10,829.19	\$10,982.14	\$21,811.33
Finance Accounting	\$0.00	\$333.00	\$333.00
Total Expenditures per quarter	\$14,218.91	\$30,659.14	\$44,878.05

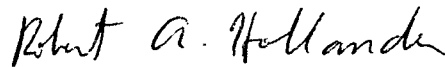
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Since this is the final report showing completion of SEP 2, in accordance with Paragraph 12 of the proposed Drinking Water Consent Decree (CD), copies of the report are being sent to Mr. Marc Steadman, Ms. Kara Christenson and Mr. Robert Brook. Paragraph 11 of the CD requires City of Phoenix to spend \$26,240 on SEP 2. In addition to this amount, the city spent \$18,638, resulting in a total of \$44,878.

I certify under penalty of law that the information contained in or accompanying this document is true, accurate, and complete to the best of my knowledge, information and belief; or as to the identified portions of this document for which I cannot personally verify their truth and accuracy, I certify that based on my inquiry of the person or persons directly responsible for gathering the information, the information is true, accurate, and complete to the best of such persons' knowledge, information and belief.

If you have any questions, please contact Nico Buliga at 602-534-5081 or myself at 602-262-4992.

Sincerely,



Robert A. Hollander, P.E.
Compliance and Regulatory Affairs Administrator

RAH:nbc:\My Documents from H\ADEQ\SEP2 - MTBE & Perchlorate NOV\1Q00Report.doc

Enclosures

C: Tony Bode, ADEQ
Marc Steadman, Office of the Attorney General
Kara Christenson, US EPA Region IX
Robert Brook, Department of Justice
George Britton (w/o enclosures)

Michael Gritzuk
Walid Alsmadi
Nico Buliga
Matthew Palenica
File: Drinking Water\NOV\SEP2

SUPPLEMENTAL ENVIRONMENTAL PROJECT #2 (SEP2)

MTBE and Perchlorate Sampling Program

City of Phoenix Water Services Department

First Quarter 2000 - Analytical Results Table

Sampling Location	Sample Site	GPS Coordinates	Zip Code	Sample Date	Sample Time (24 hrs)	Sample Depth (ft)	Air Temp (°C)	Water Temp (°C)	pH	Conductivity (µS/cm)	Specimen Number (CLO4)	CLO4 Conc. (µg/L)	Specimen Number (MTBE)	MTBE Conc. (µg/L)
POE 072	5126 N. 37th Avenue	33° 30' 46.030" N 112° 08' 19.117" W	85017	02/17/2000	10:10	GW Well	18	30	7.6	682	000007485	<4.0	000007485	<0.5
POE 113	Verde Well Field Combined	33° 32' 49.902" N 111° 39' 58.402" W	85264	02/15/2000	11:30	GW Well	26	19	7.9	543	000007136	<4.0	000007136	<0.5
POE 146	1621 W. Palmer Drive	33° 34' 17.791" N 112° 05' 37.049" W	85021	02/28/2000	09:30	GW Well	23	21	7.3	432	000008964	<4.0	000008965	<0.5
POE 166	4138 E. Greenway Road	33° 37' 37.801" N 111° 59' 25.873" W	85032	02/14/2000	11:10	GW Well	23	27	7.9	338	000006901	<4.0	000006903	<0.5
POE 218	4375 W. Acoma Drive	33° 37' 01.608" N 112° 09' 08.524" W	85306	02/23/2000	11:10	GW Well	17	34	7.7	694	000008237	<4.0	000008238	<0.5
POE 232	10831 N. 56th Street	33° 35' 08.189" N 111° 57' 34.747" W	85254	01/31/2000	11:00	GW Well	19	29	7.6	416	000004607	<4.0	000004609	<0.5
POE 233	10801 N. 56th Street	33° 35' 04.541" N 111° 57' 34.155" W	85254	01/31/2000	10:00	GW Well	20	29	7.6	415	000004597	<4.0	000004599	<0.5
POE 234 (DISCONNECTED)	5356 E. Doubletree Ranch Road	33° 34' 08.542" N 111° 57' 51.336" W	85253											
POE 235	6026 E. Caballo Drive	33° 33' 44.915" N 111° 57' 01.960" W	85253	01/31/2000	09:10	GW Well	14	28	7.6	522	000004586	<4.0	000004588	<0.5
POE 244	5602 E. Bell Road	33° 38' 26.422" N 111° 57' 32.647" W	85254	02/01/2000	08:45	GW Well	11	28	7.6	471	000004983	<4.0	000004985	<0.5
POE 249 (DISCONNECTED)	18419 N. 29th Drive	33° 39' 12.236" N 112° 07' 15.402" W	85053											
POE 250	16820 N. 47th Avenue	33° 38' 19.308" N 112° 09' 35.968" W	85306	02/22/2000	09:45	GW Well	18	34	7.4	469	000008091	<4.0	000008092	<0.5
POE 252	3308 W. Kristal Way	33° 39' 42.775" N 112° 07' 51.309" W	85027	02/16/2000	09:30	GW Well	20	30	7.4	387	000007306	<4.0	000007308	<0.5
POE 256	3615 W. Deer Valley Road	33° 41' 00.877" N 112° 08' 15.850" W	85308	02/16/2000	11:30	GW Well	23	28	7.5	390	000007311	<4.0	000007313	<0.5
POE 261	20805 N. 56th Street	33° 40' 32.843" N 111° 57' 19.181" W	85054	02/01/2000	10:15	GW Well	16	28	7.7	488	000004972	<4.0	000004974	<0.5
POE 264	6714 E. Juniper Avenue	33° 38' 23.832" N 111° 56' 05.119" W	85254	02/09/2000	11:10	GW Well	27	30	7.5	500	000006302	<4.0	000006336	<0.5
POE 275	5746 E. St. John Road	33° 38' 51.101" N 111° 57' 18.598" W	85054	02/09/2000	12:00	GW Well	29	30	7.1	470	000006342	<4.0	000006344	<0.5
POE 276	29402 N. 44th Street	33° 45' 08.318" N 111° 59' 12.828" W	85331	02/02/2000	10:45	GW Well	22	28	7.6	535	000005162	<4.0	000005164	<0.5

SUPPLEMENTAL ENVIRONMENTAL PROJECT #2 (SEP2)

MTBE and Perchlorate Sampling Program

City of Phoenix Water Services Department

First Quarter 2000 - Analytical Results Table

Sampling Location	Sample Site	GPS Coordinates	Zip Code	Sample Date	Sample Time (24 hrs)	Sample Depth (ft)	Air Temp (°C)	Water Temp (°C)	pH	Conductivity (µS/cm)	Specimen Number (CLO4)	CLO4 Conc. (µg/L)	Specimen Number (MTBE)	MTBE Conc. (µg/L)
POE 280	4390 E. Rancho Tierra Drive	33° 45' 56.425" N 111° 59' 05.654" W	85331	02/23/2000	10:10	GW Well	16	25	7.2	429	000008234	<4.0	000008235	<0.5
POE 281	33005 N. 52nd Street	33° 47' 10.711" N 111° 58' 04.575" W	85331	02/24/2000	10:45	GW Well	15	24	7.3	537	000008382	<4.0	000008383	<0.5
POE 284	8200 S. 56th Avenue	33° 22' 18.320" N 112° 10' 46.409" W	85339	02/17/2000	09:20	GW Well	22	23	6.8	1105	000007486	<4.0	000007486	<0.5
POE 288	28401 N. Tatum Boulevard	33° 44' 34.398" N 111° 58' 32.835" W	85331	02/24/2000	08:50	GW Well	14	27	7.2	478	000008379	<4.0	000008380	<0.5
POE 289	28606 N. 56th Street	33° 44' 42.036" N 111° 57' 37.129" W	85331	02/09/2000	09:00	GW Well	21	27	7.2	550	000006346	<4.0	000006347	<0.5
POE 290	26425 N. 40th Street	33° 43' 32.333" N 111° 59' 42.611" W	85024	02/02/2000	09:30	GW Well	16	28	7.8	454	000005184	<4.0	000005185	<0.5
POE 291	26268 N. Tatum Boulevard	33° 43' 27.741" N 111° 58' 39.509" W	85024	02/23/2000	09:25	GW Well	16	29	7.4	485	000008229	<4.0	000008230	<0.5
POE 292	21425 N. 47th Place	33° 40' 51.699" N 111° 58' 37.082" W	85050	02/24/2000	09:15	GW Well	14	27	7.7	422	000008384	<4.0	000008385	<0.5
Verde WTP - POE 401	Finished Water	33° 32' 50.066" N 111° 39' 59.523" W	85264	02/15/2000	11:45	N/A	26	18	7.7	537	000007137	<4.0	000007137	<0.5
Verde WTP	Raw Water	33° 32' 41.957" N 111° 40' 04.841" W	85264	02/15/2000	11:00	2	26	15	8.1	440	000007135	<4.0	000007135	<0.5
Squaw Peak WTP - POE 402	Finished Water	33° 31' 44.881" N 112° 01' 53.291" W	85016	02/29/2000	10:15	N/A	19	18	7.2	880			000009120	<0.5
Squaw Peak WTP - POE 402	Finished Water	33° 31' 44.881" N 112° 01' 53.291" W	85016	03/07/2000	10:10	N/A	22	15	7.1	786	000010097	<4.0		
Squaw Peak WTP	Raw Water	33° 31' 34.758" N 112° 01' 55.531" W	85016	02/29/2000	09:30	0.5	12	14	8.0	870			000009122	<0.5
Squaw Peak WTP	Raw Water	33° 31' 34.758" N 112° 01' 55.531" W	85016	03/07/2000	09:30	0.5	8	13	7.8	764	000010098	<4.0		
Deer Valley WTP - POE 403	Finished Water	33° 34' 04.592" N 112° 07' 35.288" W	85051	02/22/2000	12:00	N/A	23	17	7.3	820	000008106	<4.0	000008108	<0.5
Deer Valley WTP	Raw Water	33° 34' 11.878" N 112° 07' 26.487" W	85051	02/22/2000	11:50	N/A	23	17	7.8	840	000008109	4.1	000008110	<0.5
Val Vista WTP - POE 404	Finished Water	33° 27' 59.946" N 111° 46' 10.989" W	85213	02/15/2000	09:40	N/A	19	16	7.8	642	000007088	<4.0	000007089	<0.5
Val Vista WTP	Raw Water	33° 28' 19.702" N 111° 45' 36.049" W	85213	02/15/2000	08:40	2	19	16	7.8	707	000007086	<4.0	000007087	<0.5

SUPPLEMENTAL ENVIRONMENTAL PROJECT #2 (SEP2)

MTBE and Perchlorate Sampling Program

City of Phoenix Water Services Department

First Quarter 2000 - Analytical Results Table

Sampling Location	Sample Site	GPS Coordinates	Zip Code	Sample Date	Sample Time (24 hrs)	Sample Depth (ft)	Air Temp (°C)	Water Temp (°C)	pH	Conductivity (µS/cm)	Specimen Number (CLO4)	CLO4 Conc. (µg/L)	Specimen Number (MTBE)	MTBE Conc. (µg/L)
Union Hills WTP (Mod 1) - POE 405	Finished Water	33° 40' 56.920" N 112° 02' 10.009" W	85027	02/10/2000	10:40	N/A	23	15	7.4	920	000006508	5.3	000006509	<0.5
Union Hills WTP (Mod 2) - POE 406	Finished Water	33° 40' 59.582" N 112° 02' 12.046" W	85027	02/10/2000	11:05	N/A	23	15	7.7	930	000006493	5.2	000006494	<0.5
Union Hills WTP	Raw Water	33° 41' 12.652" N 112° 02' 11.413" W	85027	02/10/2000	10:10	N/A	23	17	8.0	900	000006506	5.1	000006507	<0.5
POE 777	NWC of 48th Street / Ray Road	33° 19' 13.019" N 111° 58' 48.738" W	85044	02/24/2000	09:00	GW Well	12	22	7.5	205	000008375	<4.0	000008376	<0.5
Colorado River	Havasu Pump Station	34° 7' 19.4" N 114° 66' 11.4" W	85344	02/18/2000	08:00	3	9	12	8.5	1010	000007648	6.0	000007648	<0.5
Well #15 (near Lake Havasu)	Lake Havasu City Well #15	34° 30' 20" N 114° 21' 34" W	86404	02/17/2000	12:00	GW Well	19	20	8.0	1150	000007646	<4.0	000007646	0.5
Well #16 (near Lake Havasu)	Lake Havasu City Well #16	34° 27' 53" N 114° 20' 15" W	86404	02/17/2000	13:00	GW Well	22	27	8.4	1920	000007645	<4.0	000007645	<0.5
Lake Pleasant	Towers (at the dam discharge)	33° 50' 41" N 112° 16' 17" W	85382	02/15/2000	09:00	3	15	13	8.6	930	000007046	4.0	000007047	<0.5
Lake Pleasant - Upstream	1/2 mile west of 99th Avenue	33° 46' 53.6" N 112° 17' 10.2" W	85382	02/15/2000	09:45	3	15	15	8.6	930	000007049	6.6	000007050	<0.5
Lake Pleasant - Downstream	99th Avenue and CAP Canal	33° 46' 46" N 112° 14' 48" W	85382	02/15/2000	10:45	3	19	16	8.6	910	000007051	5.4	000007052	<0.5
CAP Canal - McKellips Bridge	East of Power Road	33° 27' 04.778" N 111° 40' 16.756" W	85215	02/14/2000	09:45	4	11	14	8.4	980	000006917	5.7	000006918	<0.5
Granite Reef Diversion Dam	Downstream of Dam	33° 31' 3.214" N 111° 41' 28.617" W	85263	02/14/2000	08:30	5	10	13	8.4	700	000006919	<4.0	000006920	<0.5
Salt River / Bee Line (Blue Point Bridge)	Upstream of Granite Reef Dam	33° 33' 15.041" N 111° 34' 28.466" W	85263	02/14/2000	10:30	2	12	15	8.1	970	000006912	<4.0	000006913	<0.5
Verde River (Bush Hwy Bridge)	Upstream of Granite Reef Dam	33° 34' 50.893" N 111° 40' 13.983" W	85263	02/14/2000	11:30	2	13	16	8.2	630	000006914	<4.0	000006915	<0.5
Total number of samples												46		46

CITY OF PHOENIX WATER SERVICES DEPARTMENT

MTBE and PERCHLORATE Sampling Program Supplemental Environmental Project 2

July 8, 1999

INTRODUCTION:

Recently, perchlorate and MTBE have been found in drinking water supplies at relatively high levels in California and Nevada resulting in source water investigations and closures. This proposed sampling effort would be used to determine the levels of these chemicals in various water sources under different environmental conditions.

Perchlorate (ammonium perchlorate):

Perchlorate is a strong oxidant that is primarily used in solid-fuel rocket motors, fireworks, and explosive devices. Once, it was widely used in medicine, prescribed for the treatment of certain thyroid disorders. It is said that perchlorate is the most toxic substance known to man. The contaminant has been found in both well and surface water sources in both California and Nevada at concentrations as high as 1,000 parts per billion (ppb). Perchlorate has also been detected in the Colorado River.

MTBE (Methyl tertiary butyl ether):

Methyl tertiary butyl ether is used as an oxygenate in gasoline to produce a cleaner burning gasoline. It reduces the levels of chemicals, such as benzene, that are emitted from the burning of fuels. Although the air quality benefits of MTBE are proven, its potential impact on drinking water supplies is now raising serious concerns, for both ground water and surface water sources. In ground water, the primary source of contamination is leaking underground fuel tanks or distribution lines. In surface water, contamination comes from use of gasoline fueled recreational vehicles (i.e. boats, jet skis), spills or runoff. In the city of Santa Monica, California, over half of the drinking water supply wells have been shut down due to MTBE contamination from leaking underground fuel tanks.

The City of Phoenix wishes to initiate a sampling project to evaluate levels of Perchlorate and MTBE in its drinking water.

HEALTH IMPACTS

Perchlorate (ammonium perchlorate):

The California Department of Health Services (DHS) has announced a provisional "action level" for Perchlorate of 18 ppb on May 27, 1997. According to a California Department of Health Services News Release "perchlorate levels below 18 ppb are not considered a health concern for the public, including pregnant women and children." There is however no Arizona state or federal standard for this chemical. The primary human health concern related to perchlorate is that it can interfere with the thyroid gland's ability to utilize iodine to produce thyroid hormones. Perchlorate can also cause brain damage in fetuses and a potentially fatal form of anemia in adults. Currently, there is inadequate information to determine if there are health effects from Perchlorate at levels below 18 ppb. Perchlorate is included on EPA's drinking water Contaminant Candidate List (CCL) which was published in the Federal Register on March 2, 1998 (63CFR 10273).

MTBE (Methyl tertiary butyl ether):

Little health effects data is available for ingestion of MTBE. There is no drinking water standard for MTBE however; a secondary standard is under consideration. In 1992, EPA's Office of Water released a draft Health Advisory for MTBE in drinking water, which identified a lifetime Health Advisory level of 200 µg/L, but noted that the level would probably be lowered to 20 µg/L to account for its possible carcinogenic potential. In December 1997, another Advisory recommended that keeping levels of contamination in the range of 20 to 40 µg/L or below, will protect consumer acceptance of the water resource due to taste and odor concerns and would also provide a large margin of safety from exposure to toxic effects. A final health advisory has not been issued to date.

RESULTS OF PREVIOUS SAMPLING BY THE CITY OF PHOENIX

In response to recommendations by the American Water Works Association (AWWA) and the Association of Metropolitan Water Agencies (AMWA) to sample for Perchlorate and MTBE in their systems the City did some sampling in 1998.

During the second quarter, Perchlorate (detection limit of 4 ppb) was detected only at the Union Hills Water Treatment Plant that receives water from the Colorado River. It was detected at levels below 8 ppb, which are less than the 18 ppb action level that California adopted. It was not detected at any other location.

MTBE and the other gasoline components (detection limit of 0.5 ppb) were not detected at any location.

Proposed Program:

Analysis results of samples collected during the second quarter 1998 showed that MTBE was not detected in any samples. On the other hand, Perchlorate was detected at the Union Hills WTP.

The proposed program will target two goals:

- ❑ Evaluate levels of Perchlorate and MTBE under different environmental conditions by taking samples during 1st and 3rd calendar quarters. First quarter is the coldest period of the year while third quarter is the warmest period of the year. This also reflects on the activities occurring at the surface water source locations. These activities include boating and jet skiing. During the 3rd quarter, a high volume of recreation occurs on the lakes. During the 1st quarter, recreation activities are very limited. On the other hand, in Maricopa County higher levels of oxygenates, including MTBE are added to vehicle fuel during the period from April 1 through October 31, which may result in higher MTBE levels in air that may make its way to the water sources through particulate deposition and monsoon rains.
- ❑ Extend sampling locations to include water source sampling. The Colorado River at the Havasu Pump Station as well as some groundwater wells close to the river will be sampled to evaluate levels of Perchlorate and MTBE in the river and the impact of the river contamination, if it exists, on the groundwater. Also, the Central Arizona Project (CAP) water will be sampled from the canal after it leaves the Phoenix metropolitan area. This may help evaluate the impact of urban areas and air pollution on water quality in the canal.
- ❑ In addition to Perchlorate and MTBE analysis, samples will be analyzed for the following parameters:
 - Water temperature,
 - Water pH and
 - Water conductivity.

Also, the following information will be provided, if available:

- GPS reading for each sampling site,
- Water depth representative of where the sample was drawn,
- Ambient temperature at the time and location of sampling and
- Postal zip code of the sampling site.

To determine the presence of Perchlorate and MTBE (including the other major components of gasoline), sampling at the following locations is recommended:

- | | |
|---|-----------------------|
| • Colorado River (Havasu Pump Station) | 1 sample per quarter |
| • Groundwater sampling near the Colorado River | 2 samples per quarter |
| • Lake Pleasant | 1 sample per quarter |
| • CAP Canal after leaving the Phoenix Metropolitan Area | 1 sample per quarter |

• Granite Reef diversion dam	1 sample per quarter
• Salt River (if detects occur in Granite Reef)	1 sample per quarter
• Verde River (if detects occur in Granite Reef)	1 sample per quarter
• All five City of Phoenix water treatment plants (Raw Water)	5 samples per quarter
• Specific target water source (POE 406 - Union Hills WTP-Mod 2)	1 sample per quarter
• Points of entry within water systems operated by City of Phoenix	32 samples per quarter
<hr/>	
Total number of samples per quarter	46

SAMPLING FREQUENCY:

Sampling must be conducted during a winter and a summer season:

- Third quarter of 1999 (between the months of July 1999 and September 1999)
- First quarter of 2000 (between the months of January 2000 and March 2000)

Analysis cost

Analysis total estimated cost per quarter = $46 * (75+25+145)$
= \$11,270

Lake Pleasant	
Vehicle	\$45
Labor	\$120

Study total estimated cost = 2 * (11,270 + 1,850)
= \$26,240

Perchlorate and MTBE Supplemental Environmental Project Timeline

Sampling Locations	1st Quarter 1999	2nd Quarter 1999	3rd Quarter 1999	4th Quarter 1999	1st Quarter 2000	2nd Quarter 2000	3rd Quarter 2000	4th Quarter 2000
Colorado River (Havasu Pump Station)								
Ground water sampling near the Colorado River			See Note 1		See Note 1			
Lake Pleasant								
CAP Canal after leaving the Phoenix Metropolitan Area								
Granite Reef diversion dam								
Salt River (if detects occur in Granite Reef)								
Verde River (if detects occur in Granite Reef)								
Verde Water Treatment Plant								
Squaw Peak Water Treatment Plant								
Deer Valley Water Treatment Plant								
Val Vista Water Treatment Plant								
Union Hills Water Treatment Plant (Mod 1)								
Specific target water source								
Points of entry within water systems operated by the City of Phoenix			See Note 2		See Note 2			
Sampling result Reports				See Note 3		See Note 3		

Note:

1) Two samples are to be taken at two different sampling locations.

2) In the two samples are to be taken at two different sampling locations or at active POEs, whichever is less.

3) Sampling result Reports are to be submitted within 30 days of the close of the sampling quarter.

SUPPLEMENTAL ENVIRONMENTAL PROJECT #2 (SEP2)

MTBE and Perchlorate Sampling Program

City of Phoenix Water Services Department

Third Quarter 1999 - Amended Analytical Results Table

Sampling Location	Sample Site	GPS Coordinates	Zip Code	Sample Date	Sample Time (24 hrs)	Sample Depth (ft)	Air Temp (°C)	Water Temp (°C)	pH	Conductivity (µS/cm)	Specimen Number (CLO4)	CLO4 Conc. (µg/L)	Specimen Number (MTBE)	MTBE Conc. (µg/L)
POE 072	5126 N. 37th Avenue	33° 30' 46.030" N 112° 08' 19.117" W	85017	08/03/1999	11:00	GW Well	N/A	36.2	7.7	820	990027829	<4.0	No sample	
POE 072	5126 N. 37th Avenue	33° 30' 46.030" N 112° 08' 19.117" W	85017	09/02/1999	9:15	GW Well	33	34.4	8.3	810	No sample		990031618	<0.5
POE 113	Verde Well Field	33° 32' 49.902" N 111° 39' 58.402" W	85264	08/18/1999	12:30	GW Well	N/A	27	7.6	N/A	990029777	<4.0	990029778	<0.5
POE 146	1621 W. Palmer Drive	33° 34' 17.791" N 112° 05' 37.049" W	85021	08/04/1999	10:45	GW Well	N/A	25.5	7.4	N/A	990027970	<4.0	No sample	
POE 146	1621 W. Palmer Drive	33° 34' 17.791" N 112° 05' 37.049" W	85021	08/19/1999	11:00	GW Well	N/A	27	7.2	N/A	No sample		990029852	<0.5
POE 166 (out of service)	4138 E. Greenway	33° 37' 37.801" N 111° 59' 25.873" W	85032											
POE 218 (out of service)	4375 W. Acoma Drive	33° 37' 01.608" N 112° 09' 08.524" W	85306											
POE 232	10831 N. 56th Street	33° 35' 08.189" N 111° 57' 34.747" W	85254	08/23/1999	9:00	GW Well	N/A	31.9	7.3	N/A	990030241	<4.0	990030241	<0.5
POE 233	10801 N. 56th Street	33° 35' 04.541" N 111° 57' 34.155" W	85254	08/24/1999	9:15	GW Well	N/A	33.1	7.3	N/A	990030437	<4.0	990030437	<0.5
POE 234 (out of service)	5356 E. Doubletree Ranch Road	33° 34' 08.542" N 111° 57' 51.336" W	85253											
POE 235	6026 E. Caballo Drive	33° 33' 44.915" N 111° 57' 01.960" W	85253	08/23/1999	11:15	GW Well	N/A	33	7.3	N/A	990030243	<4.0	990030243	<0.5
POE 244	5602 E. Bell Road	33° 38' 26.422" N 111° 57' 32.647" W	85254	08/25/1999	11:15	GW Well	N/A	35	7.4	N/A	990030634	<4.0	990030634	<0.5
POE 249 (out of service)	18419 N. 29th Drive	33° 39' 12.236" N 112° 07' 15.402" W	85053											
POE 250	16820 N. 47th Avenue	33° 38' 19.308" N 112° 09' 35.968" W	85306	08/09/1999	10:15	GW Well	N/A	36.1	7.6	N/A	990028566	<4.0	990028567	<0.5
POE 252	3308 W. Kristal Way	33° 39' 42.775" N 112° 07' 51.309" W	85027	08/24/1998	11:15	GW Well	N/A	32.5	7.3	N/A	990030439	<4.0	990030439	<0.5
POE 256	3615 W. Deer Valley Road	33° 41' 00.877" N 112° 08' 15.850" W	85308	09/15/1999	11:20	GW Well	30	27.8	7.81	440	990033367	<4.0	990033368	<0.5
POE 261	20805 N. 56th Street	33° 40' 32.843" N 111° 57' 19.181" W	85054	09/08/1999	10:20	GW Well	33	32	7.67	980	990032387	<4.0	990032388	<0.5
POE 264 (out of service)	6714 E. Juniper Avenue	33° 38' 23.832" N 111° 56' 05.119" W	85254											

Amendments:

11/5/99 - Amended perchlorate result for Speciment Number 990034682

SUPPLEMENTAL ENVIRONMENTAL PROJECT #2 (SEP2)

MTBE and Perchlorate Sampling Program

City of Phoenix Water Services Department

Third Quarter 1999 - Amended Analytical Results Table

Sampling Location	Sample Site	GPS Coordinates	Zip Code	Sample Date	Sample Time (24 hrs)	Sample Depth (ft)	Air Temp (°C)	Water Temp (°C)	pH	Conductivity (µS/cm)	Specimen Number (CLO4)	CLO4 Conc. (µg/L)	Specimen Number (MTBE)	MTBE Conc. (µg/L)
POE 275	5746 E. St. John Road	33° 38' 51.101" N 111° 57' 18.598" W	85054	08/25/1999	9:30	GW Well	N/A	33.3	7.3	N/A	990030632	<4.0	990030632	<0.5
POE 276	29402 N. 44th Street	33° 45' 08.318" N 111° 59' 12.828" W	85331	08/31/1999	12:45	GW Well	38	32	7.5	510	990031319	<4.0	990031320	<0.5
POE 280	4390 E. Rancho Tierra Drive	33° 45' 56.425" N 111° 59' 05.654" W	85331	08/30/1999	12:55	GW Well	38	29.5	7.1	N/A	990031154	<4.0	990031154	<0.5
POE 281	33005 N. 52nd Street	33° 47' 10.711" N 111° 58' 04.575" W	85331	09/07/1999	12:35	GW Well	40	32	7.43	680	990032247	<4.0	990032248	<0.5
POE 284	8200 S. 56th Avenue	33° 22' 18.320" N 112° 10' 46.409" W	85339	08/03/1999	8:30	GW Well	N/A	27.8	7.4	N/A	990027856	<4.0	No sample	
POE 284	8200 S. 56th Avenue	33° 22' 18.320" N 112° 10' 46.409" W	85339	08/19/1999	9:45	GW Well	N/A	28.4	7.8	N/A	No sample		990029851	<0.5
POE 288	28401 N. Tatum Boulevard	33° 44' 34.398" N 111° 58' 32.835" W	85331	08/31/1999	9:15	GW Well	34	30	7.3	560	990031313	<4.0	990031314	<0.5
POE 289	28606 N. 56th Street	33° 44' 42.036" N 111° 57' 37.129" W	85331	09/01/1999	9:45	GW Well	30	29.2	7.6	474	990031434	<4.0	990031435	<0.5
POE 290	26231 N. 32nd Street	33° 43' 32.333" N 111° 59' 42.611" W	85024	09/07/1999	10:35	GW Well	38	32	7.7	490	990032238	<4.0	990032239	<0.5
POE 291	26268 N. Tatum Boulevard	33° 43' 27.741" N 111° 58' 39.509" W	85024	08/11/1999	11:30	GW Well	N/A	30.5	8.1	N/A	990028908	<4.0	990028909	<0.5
POE 292	21425 N. 47th Place	33° 40' 51.699" N 111° 58' 37.082" W	85050	09/15/1999	9:50	GW Well	30	28.5	7.78	430	990033370	<4.0	990033371	<0.5
Verde WTP (out of service)	Finished Water	33° 32' 50.066" N 111° 39' 59.523" W	85264											
Verde WTP (out of service)	Raw Water	33° 32' 41.957" N 111° 40' 04.841" W	85264											
Squaw Peak WTP	Finished Water	33° 31' 44.881" N 112° 01' 53.291" W	85016	09/16/1999	11:00	N/A	25	30.6	7.56	1270	990033523	<4.0	990033523	<0.5
Squaw Peak WTP	Raw Water	33° 31' 34.758" N 112° 01' 55.531" W	85016	09/16/1999	10:15	5	35	26	8.07	1420	990033524	<4.0	990033524	<0.5
Deer Valley WTP	Finished Water	33° 34' 04.592" N 112° 07' 35.288" W	85051	08/09/1999	12:15	N/A	N/A	29.4	6.9	N/A	990028554	<4.0	990028555	<0.5
Deer Valley WTP	Raw Water	33° 34' 11.878" N 112° 07' 26.487" W	85051	08/09/1999	11:45	N/A	N/A	29.4	7.5	N/A	990028552	<4.0	990028553	<0.5
Val Vista WTP	Finished Water	33° 27' 59.946" N 111° 46' 10.989" W	85213	09/14/1999	13:15	N/A	39	26.9	7.51	1230	990033234	<4.0	990033235	<0.5

Amendments:

11/5/99 - Amended perchlorate result for Specimen Number 990034682

SUPPLEMENTAL ENVIRONMENTAL PROJECT #2 (SEP2)

MTBE and Perchlorate Sampling Program

City of Phoenix Water Services Department

Third Quarter 1999 - Amended Analytical Results Table

Sampling Location	Sample Site	GPS Coordinates	Zip Code	Sample Date	Sample Time (24 hrs)	Sample Depth (ft)	Air Temp (°C)	Water Temp (°C)	pH	Conductivity (µS/cm)	Specimen Number (CLO4)	CLO4 Conc. (µg/L)	Specimen Number (MTBE)	MTBE Conc. (µg/L)
Val Vista WTP	Raw Water	33° 28' 19.702" N 111° 45' 36.049" W	85213	09/14/1999	12:20	N/A	40	24.9	8.08	1230	990033229	<4.0	990033230	<0.5
Union Hills WTP (Mod 1)	Finished Water	33° 40' 56.920" N 112° 02' 10.009" W	85027	09/08/1999	12:20	N/A	25	22	7.64	990	990032375	<4.0	990032376	<0.5
Union Hills WTP (Mod 2)	Finished Water	33° 40' 59.582" N 112° 02' 12.046" W	85027	09/08/1999	12:30	N/A	26	20	7.66	970	990032371	<4.0	990032372	<0.5
Union Hills WTP	Raw Water	33° 40' 12.652" N 112° 02' 11.413" W	85027	09/08/1999	11:50	N/A	29	25	7.73	1040	990032373	<4.0	990032374	<0.5
POE 777	NWC of 48th Street / Ray Road	33° 19' 13.019" N 111° 58' 48.738" W	85044	09/14/1999	10:55	GW Well	41	30.9	7.56	1730	990033226	<4.0	990033227	<0.5
Colorado River	Havasupai Pump Station	34° 7' 19.4" N 114° 66' 11.4" W	85344	07/13/1999	7:00	6	26.1	28	8.2	899	990024073	7.3	990024074	2.8
Well #15 (near Colorado River)	Lake Havasu City Well #15	34° 30' 20" N 114° 21' 34" W	86404	09/21/1999	9:00	500	30	22.7	7.4	1110	990034189	<4.0	990034187	<0.5
Well #16 (near Colorado River)	Lake Havasu City Well #16	34° 27' 53" N 114° 20' 15" W	86404	09/21/1999	8:00	125	30	26.6	7.6	1770	990034190	<4.0	990034188	<0.5
Lake Pleasant	Towers (at the dam discharge)	33° 50' 41" N 112° 16' 17" W	85382	07/14/1999	10:30	N/A	35	17.6	8.1	780	990024270	<4.0	990024271	<0.5
Lake Pleasant Upstream	1/2 mile west of 99th Avenue	33° 46' 53.6" N 112° 17' 10.2" W	85382	08/20/1999	14:30	4	30	31.7	8.2	910	990030193	6.7	990030193	<0.5
Lake Pleasant Downstream	99th Avenue and CAP Canal	33° 46' 46" N 112° 14' 48" W	85382	08/20/1999	13:45	3	38	21.6	7.7	970	990030194	4.5	990030194	<0.5
CAP Canal/East of Power Road	McKellips Bridge	33° 27' 04.778" N 111° 40' 16.756" W	85215	08/20/1999	11:30	3	38	22.6	8.1	917	990030195	5.6	990030195	<0.5
Granite Reef Diversion Dam	Downstream of Dam	33° 31' 3.214" N 111° 41' 28.617" W	85263	09/23/1999	10:30	5	33	26.8	7.6	1260	990034504	<4.0	990034504	<0.5
Salt River/Bee Line (Blue Point Bridge)	Upstream of Granite Reef Dam	33° 33' 15.041" N 111° 34' 28.466" W	85263	09/24/1999	13:15	2.5	35	27	8.3	1190	990034682	<4.0	990034683	1.2
Verde River (Bush Hwy Bridge)	Upstream of Granite Reef Dam	33° 34' 50.893" N 111° 40' 13.983" W	85263	09/23/1999	12:00	3	34	31.5	8.5	560	990034505	<4.0	990034505	<0.5
Total number of samples												41		41

Amendments:

11/5/99 - Amended perchlorate result for Specimen Number 990034682